

What is claimed is:

- 1 1. A method for manufacturing a nanowire, the method comprising:
2 forming a conductive metal particle on an insulating substrate; and
3 introducing a germanium-containing gas to the conductive metal particle and
4 growing a germanium nanowire extending from the conductive metal particle.
- 1 2. The method of claim 1, further comprising:
2 heating the insulating substrate, prior to introducing a germanium-containing gas.
- 1 3. The method of claim 1, further comprising introducing a co-flow of gas including
2 hydrogen to the conductive metal particle while growing the germanium nanowire.
- 1 4. The method of claim 1, wherein forming a conductive metal particle includes
2 forming at least one of: gold, a highly-conductive metal particle and a conductive metal
3 particle having a eutectic phase in alignment with germanium.
- 1 5. A method of manufacturing a germanium nanowire, the method comprising:
2 patterning at least one region having gold on an insulating substrate;
3 placing the insulating substrate into a CVD chamber and heating the substrate;
4 and

5 introducing a germanium-containing gas and hydrogen to the heated substrate and
6 growing at least one germanium nanowire extending from the at least one patterned gold
7 region.

1 6. The method of claim 5, wherein patterning at least one region having gold on an
2 insulating substrate includes patterning at least one gold cluster.

1 7. The method of claim 5, wherein patterning at least one region having gold on an
2 insulating substrate includes patterning at least one island of gold particles.

1 8. The method of claim 7, wherein patterning at least one island of gold particles
2 includes patterning an island having a diameter of about 20 nanometers.

1 9. The method of claim 5, wherein placing the insulating substrate in a CVD
2 chamber and heating the substrate includes sufficiently heating the substrate to cause the
3 germanium-containing gas to dissolve in the patterned gold.

1 10. The method of claim 9, wherein sufficiently heating the substrate includes heating
2 the substrate to about 250 degrees Celsius.

1 11. The method of claim 9, wherein sufficiently heating the substrate includes heating
2 the substrate to at least about 275 degrees Celsius.

1 12. The method of claim 9, wherein sufficiently heating the substrate includes heating
2 the substrate to about the eutectic temperature of an alloy formed including the
3 germanium and gold.

1 13. The method of claim 12, wherein sufficiently heating the substrate includes
2 heating the substrate to about 360 degrees Celsius.

1 14. The method of claim 9, wherein sufficiently heating the substrate includes heating
2 the substrate to less than about 600 degrees Celsius.

1 15. The method of claim 9, wherein patterning at least one region having gold
2 includes patterning the region sufficiently small such that the melting temperature of an
3 alloy including the gold and germanium is below the eutectic temperature of about 360
4 degrees Celsius.

1 16. The method of claim 15, wherein sufficiently heating the substrate includes
2 heating the substrate to between about 275 degrees Celsius and 300 degrees Celsius.

1 17. The method of claim 5, wherein introducing hydrogen to the heated substrate
2 includes introducing a sufficient amount of hydrogen and inhibiting decomposition of the
3 germanium-containing gas.

1 18. The method of claim 5, wherein growing at least one germanium nanowire
2 includes forming an alloy including germanium and gold and precipitating a germanium
3 nanowire from the alloy.

1 19. The method of claim 5, wherein growing at least one germanium nanowire
2 extending from the at least one patterned gold region includes growing the nanowire
3 extending to the substrate and lifting off the gold particle from the substrate via the
4 nanowire growth.

1 20. The method of claim 5, wherein growing at least one germanium nanowire
2 includes using a seeded vapor-liquid-solid mechanism via the gold.

1 21. A germanium nanowire manufactured in a manner not inconsistent with claim 5.

1 22. An electronic circuit comprising the germanium nanowire of claim 21.

1 23. A method for manufacturing a germanium-containing nanowire, the method
2 comprising:

3 dissolving germanium in a gold particle and forming an alloy including
4 germanium and gold;

5 introducing germanium to the alloy, increasing the concentration of germanium in
6 the alloy and liquefying the alloy; and

7 after liquefying the alloy, further introducing germanium to the alloy and
8 supersaturating the alloy with germanium; and
9 precipitating the supersaturated alloy and growing a germanium-containing
10 nanowire.

1 24. An electronic circuit comprising:
2 a germanium nanowire manufactured in a manner not inconsistent with claim 23.

1 25. An arrangement for growing a germanium nanowire from an insulating substrate
2 having a patterned gold region thereon, the arrangement comprising:
3 means for heating the substrate; and
4 means for introducing a germanium-containing gas to the heated substrate and
5 growing at least one germanium nanowire extending from the patterned gold region.

1 26. A method for manufacturing a nanowire, the method comprising:
2 forming a conductive metal particle on an insulating substrate; and
3 introducing a gas including semiconducting material to the conductive metal
4 particle and forming an alloy including the semiconducting material and the conductive
5 metal particle and growing a nanowire extending from the alloy, the nanowire including
6 said semiconducting material.